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10/802,032	03/17/2004	Andrew Mark Nightingale	550-534	3472
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EXAMINER JANAKIRAMAN, NITHYA				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/802,032

Applicant(s)

NIGHTINGALE ET AL.

Examiner

NITHYA JANAKIRAMAN

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This action is in response to the submission filed on 1/24/2008. Claims 1-46 are presented for examination.

Response to Arguments- Drawings

1. Applicant's amendments have been fully considered and are persuasive. The objections to the drawings have been withdrawn.

Response to Arguments- Abstract

2. Applicant's amendments have been fully considered and are persuasive. The objection to the abstract has been withdrawn.

Response to Arguments- 35 U.S.C §101

3. Applicant's amendments have been fully considered and are persuasive. The rejections of claims 1-46 have been withdrawn.

Response to Arguments- 35 U.S.C §103

4. Applicant's arguments filed 1/24/2008 have been fully considered but they are not persuasive.

Argument 1:

5. Applicant argues on page 21 that "Fischer is not concerned with simulating the operation of a data processing apparatus".

6. The Fischer reference is not being used by the Examiner to teach the limitation of simulation. Thekkath states in column 5, lines 29-37, "...simulating, fabricating, or testing an integrated bus master device".

Argument 2:

7. Applicant argues on page 21 that "Fischer's adjusting the timing of future transactions based upon the performance of preceding transactions is not useful".

8. On the contrary, Fischer utilizes the preceding timing information in order to anticipate, and therefore, adjust the timing of future transactions. The adjustment would not be possible without first anticipating.

Argument 3:

9. Applicant argues on page 21 that Thekkath does not disclose "simulating the operation of a data processing apparatus", nor does Thekkath "describe generating anticipated timing data or generation of revised timing data because the role of Thekkath's arbiter is to prevent bus transactions from ever overlapping".

10. Thekkath discloses "...simulating, fabricating, or testing an integrated bus master device" in column 5, lines 29-37. Also, the claim as written currently does not provide for having the bus transactions overlapping. Claim 1 states "**in the event** that the anticipated timing information indicates that two or more concurrent data transfers **would** occur on the bus, generating machine-readable **revised timing information**". Actual overlapping is not required by the current claim language, as the timing information is revised in anticipation of the overlap. Indeed Thekkath teaches the detection of transaction interferences in column 7, lines 1-5, using

arbitration logic, in order to avoid overlap. Applicant appears to be arguing that actual bus interference is claimed. Clarification is requested.

Argument 4:

11. Applicant argues on pages 21-22 that Fischer and Thekkath would not be combined because the nature of Fischer's network means that "it would be subjective to place an arbiter at any particular point".

12. The Examiner does not see the relevance of the subjectivity of arbiter placement, or the relevance of the size of Fischer's network. See below for a statement of obviousness.

Argument 6:

13. Applicant argues on page 22 that if Thekkath and Fischer were combined "at best the result would be a system where no overlapping transactions would occur because any overlapping transaction would be prevented by Thekkath's arbiter".

14. Again, the Examiner requests clarification as to whether actual overlap is intended to occur, as the current claim language does not allow for this.

Specification

15. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

16. Claim 46 is objected to because of the following informalities: line 2 states "program for simulation for simulating". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

17. Claims 1-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 12 have been amended to read “machine-readable”, however there is no support within the specification for the added language. All depending claims are rejected as well.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 1-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0163932, Fischer (hereinafter Fischer) in view of US Patent 6,393,500, Thekkath (hereinafter Thekkath).

19. Fischer discloses a method for transaction between a master device and a slave device, and continuously generating revised timing information for the data transactions over the

network (see Abstract). However, Fischer does not simulate the transaction, nor does Fischer compensate for two or more concurrent transactions.

20. Thekkath discloses determining whether two or more data transfers occur over a bus, and provides for precluding bus contentions (see column 6, lines 57-67 and column 7, lines 1-5), as well as for simulating the bus/master device.

21. Fischer and Thekkath are analogous art because they are both related to the field of data transfers over a bus.

22. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the simulation of Thekkath with the bus transactions of Fischer because it is desirable to test and simulate for “a burst data transaction to be optimized...for efficient transfer over a bus” (see Thekkath, column 6, lines 14-25). It would also have been obvious to one having ordinary skill in the art at the time the invention was made to combine the provisions for bus contention of Thekkath with the method of transferring data over a bus of Fischer, because “If two devices were to execute a data transfer at the same time, then signals on the bus would be corrupted, thus precluding any transfer of data” (see Thekkath, column 1, lines 62-67), which is clearly undesirable to one of ordinary skill in the art.

23. Regarding claim 1, Fischer and Thekkath teach:

A method of simulating the operation of a data processing apparatus (*Thekkath, column 5, lines 29-37*) to determine timing information of data transfers, the data processing apparatus comprising a number of master logic units and slave logic units coupled via a bus, the data processing apparatus being operable to perform the data transfers between the master logic units and the slave logic units over the bus (*Fischer, paragraph [0012], “master node”, “slave node”*), the method comprising the steps of:

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a) generating anticipated timing information for each successive data transfer over the bus by assuming that each successive data transfer can occur with exclusive access to the bus (*Fischer teaches that timing information is determined for each data transfer in paragraph [0012], "Best packet assembly times for packets to be transmitted by the particular slave node to the master node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times"*);

b) determining whether the anticipated timing information indicates that two or more concurrent data transfers would occur on the bus (*Thekkath teaches that transaction interference on a bus would be avoided by detecting what would be the capability of a bus and adjusting accordingly using arbitration logic, column 5, lines 1-10, "The transaction control logic varies burst width according to the burst transaction capability"; column 7, lines 1-5, "...preclude bus contentions and to provide fair and timely access to the bus for all initiating devices"*); and

c) in the event that the anticipated timing information indicates that two or more concurrent data transfers would occur on the bus (*Thekkath teaches the detection of transaction interference in column 7, lines 1-5, using arbitration logic*), generating machine-readable revised timing information for those data transfers for use in correcting said anticipated timing information as part of simulation output results, the revised timing information being generated using bus status information until those data transfers have been completed (*Fischer teaches that continuous revisions take place to adjust for the transaction interference, or errors, of Thekkath in paragraph [0012], "Each slave node clock is continuously corrected compared with the master node clock to smooth slave clock error to an average of zero compared with the master clock as a reference in response to a message from the master node...Packets at slave nodes are then transmitted according to the determined future best packet assembly time information"*).

24. Regarding claim 2, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein the step a) further comprises the step of generating anticipated timing information for each successive data transfer between one master logic unit and one slave logic unit over the bus to which that master logic unit and that slave logic unit have exclusive access (*Fischer, paragraph [0012], "Best packet assembly times for packets to be transmitted by the particular slave node to the master node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times"*).

25. Regarding claim 3, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein the anticipated timing information comprises a data transfer window indicative of the time during which that data transfer will occur over the bus (*Fischer, paragraph [0012], "Best packet assembly times for packets to be transmitted by the particular slave node to the master node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times"*).

26. Regarding claim 4, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein the anticipated timing information comprises data transfer commencement information indicative of the time at which that data transfer will commence on the bus and data transfer completion information indicative of the time at which that data transfer will complete on the bus (*Fischer, paragraph [0012], "Best packet assembly times for packets to be transmitted by the particular slave node to the master node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times"*).

27. Regarding claim 5, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein each data transfer comprises the transfer of a number of data values over the bus and the anticipated timing information comprises data value transfer information indicative of the time at which each data value will be transferred over the bus (*Fischer, paragraph [0012], "A best arrival time for the reception by the master node of each particular packet transmitted by each particular slave node is determined at the master node"*).

28. Regarding claim 6, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein the step b) further comprises the step of comparing the anticipated timing information for each successive data transfer to determine whether two or more concurrent data transfers would occur on the bus (*Thekkath, column 7, lines 1-5*).

29. Regarding claim 7, Fischer and Thekkath teach:

The method as claimed in claim 6, wherein the step b) further comprises the step of determining whether two or more concurrent data transfers would occur on the bus by determining whether the anticipated timing information indicates that one data transfer will not complete prior to another data transfer commencing (*Thekkath, column 7, lines 1-5*).

30. Regarding claim 8, Fischer and Thekkath teach:

The method as claimed in claim 1, wherein the step c) further comprises the step of generating bus status information indicative of the status of the bus during at least a period when the anticipated timing information indicates that two or more concurrent data transfers would occur on the bus (*Thekkath, column 7, lines 1-5*).

31. Regarding claim 9, Fischer and Thekkath teach:

The method as claimed in claim 8, wherein the bus status information includes information indicative of which master logic unit/slave logic unit pair have access to the bus at any point in time during at least the period (*Fischer, paragraph [0055]*).

32. Regarding claim 10, Fischer and Thekkath teach:

The method as claimed in claim 8, wherein the step c) further comprises the step determining from the generating bus status information which of those data transfers will occur on the bus at any point in time during at least the period (*Fischer, paragraph [0055]*).

33. Regarding claim 11, Fischer and Thekkath teach:

The method as claimed in claim 9, wherein the step c) further comprises the step of generating revised timing information indicative of the time during which each of those data transfers occur over the bus (*Fischer, paragraph [0012]*, *Best packet assembly times for packets to be transmitted by the particular slave node to the master node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times*”).

34. Regarding claim 12 (29 and 46), Fischer and Thekkath teach:

A method of simulating the operation of a data processing apparatus (*Thekkath, column 5, lines 29-37*) using a software model to determine timing information of data transfers (*Fischer, paragraph [0493]*, *“The simulation models a master clock jitter...”*), the data processing apparatus comprising a number of master logic units and slave logic units coupled via a bus, the data processing apparatus being operable to perform the data transfers between the master logic units and the slave logic units over the bus (*Fischer, paragraph [0012]*, *“master node”, “slave node”*), the method comprising the steps of:

- a) in response to an indication that a data transfer is to occur, generating data transfer information indicative of the data transfer using a master logic unit model and a slave logic unit model (*paragraph [0012]*, *“Best arrival times for packets transmitted from slave nodes to the master node are communicated from the master node to the slave nodes”*);
- b) generating anticipated timing information from the data transfer information using the master logic unit model and the slave logic unit model, the anticipated timing information being generated by assuming that the data transfer will occur with exclusive access to the bus (*Fischer teaches that timing information is determined for each data transfer in paragraph [0012]*, *“Best packet assembly times for packets to be transmitted by the particular slave node to the master*

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node in the future in order for the packets to be received by the master node at future master clock referenced best arrival times");

c) determining from the anticipated timing information whether two or more concurrent data transfers will occur on the bus (*Thekkath teaches that transaction interference on a bus would be avoided by detecting what would be the capability of a bus and adjusting accordingly using arbitration logic, column 5, lines 1-10, "The transaction control logic varies burst width according to the burst transaction capability"; column 7, lines 1-5, "...preclude bus contentions and to provide fair and timely access to the bus for all initiating devices";* and

d) in the event that it is anticipated that two or more concurrent data transfers will occur on the bus (*Thekkath teaches the detection of transaction interference in column 7, lines 1-5, using arbitration logic*), generating machine-readable revised timing information for those data transfers using the master logic unit model and the slave logic unit model, the revised timing information being generated by modelling the status of the bus during at least the period when it is anticipated that two or more concurrent data transfers will occur (*Fischer teaches that continuous revisions take place to adjust for the transaction interference, or errors, of Thekkath in paragraph [0012], "Each slave node clock is continuously corrected compared with the master node clock to smooth slave clock error to an average of zero compared with the master clock as a reference in response to a message from the master node...Packets at slave nodes are then transmitted according to the determined future best packet assembly time information"*).

35. Regarding claim 13 (and 30), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein the data transfer information includes information indicative of the type and size of data transfer (*Fischer, paragraph [0009]*).

36. Regarding claim 14 (and 31), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein the step b) comprises generating anticipated timing information comprising timing values generated by the master logic unit model and the slave logic unit model indicative of the time during which that data transfer will occur over the bus (*Fischer, paragraph [0012], "Best arrival times for packets transmitted from slave nodes to the master node are communicated from the master node to the slave nodes"*).

37. Regarding claim 15 (and 32), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein the step b) comprises generating anticipated timing information comprising data transfer commencement information using the master logic unit model, the data transfer commencement information being indicative of the time at which that data transfer will commence on the bus and generating data transfer completion information

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using the slave logic unit model, the data transfer completion information being indicative of the time at which that data transfer will complete on the bus (*Fischer, paragraph [0012], "Packets at slave nodes are then transmitted according to the determined future best packet assembly time information"*).

38. Regarding claim 16 (and 33), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein each data transfer comprises the transfer of a number of data values over the bus and the step b) comprises generating anticipated timing information comprising data value transfer information indicative of the time at which each data value will be transferred over the bus (*Fischer, paragraph [0012], "Best arrival times for packets transmitted from slave nodes to the master node are communicated from the master node to the slave nodes"*).

39. Regarding claim 17 (and 34), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein the step c) further comprises the step of comparing the anticipated timing information for each successive data transfer using an arbiter model to determine whether two or more concurrent data transfers would occur on the bus (*Thekkath, column 7, lines 1-5*).

40. Regarding claim 18 (and 35), Fischer and Thekkath teach:

The method as claimed in claim 17, wherein the step c) further comprises the step of determining whether two or more concurrent data transfers would occur on the bus by determining whether the anticipated timing information indicates that one data transfer will not complete prior to another data transfer commencing (*Thekkath, column 7, lines 1-5*).

41. Regarding claim 19 (and 36), Fischer and Thekkath teach:

The method as claimed in claim 12, further comprising the step of: generating a transaction including the data transfer information (*Fischer, paragraph [0012]*).

42. Regarding claim 20 (and 37), Fischer and Thekkath teach:

The method as claimed in claim 19, wherein the steps a) and b) comprise the steps of:

generating master data transfer information and master anticipated timing information from the data transfer information using a master logic unit model;

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storing the master data transfer information and the master anticipated timing information in the transaction;

passing the transaction to the slave logic unit model;

generating slave data transfer information and slave anticipated timing information from the data transfer information using a slave logic unit model; and

storing the slave data transfer information and the slave anticipated timing information in the transaction (*Fischer, paragraph [0012]*).

43. Regarding claim 21 (and 38), Fischer and Thekkath teach:

The method as claimed in claim 19, wherein the step c) further comprises the steps of:

passing the transaction to an arbiter model; updating a bus allocation table with the anticipated timing information in the transaction (*Fischer, paragraph [0012]*);

determining from the bus allocation table whether two or more concurrent data transfers are anticipated to occur (*Thekkath, column 7, lines 1-5*).

44. Regarding claim 22 (and 39), Fischer and Thekkath teach:

The method as claimed in claim 19, wherein in the event that it is anticipated that two or more concurrent data transfers will occur the step d) further comprises the steps of:

causing each master logic unit model and slave logic unit model associated with the two or more concurrent data transfers to initialise timing models operable to simulate bus signals generated by each of the corresponding master logic units and slave logic units on a clock cycle by clock cycle basis (*Fischer, paragraph [0012]*).

45. Regarding claim 23 (and 40), Fischer and Thekkath teach:

The method as claimed in claim 22, wherein in the event that it is anticipated that two or more concurrent data transfers will occur the step d) further comprises the steps of:

setting a current clock cycle from which the bus signals are to be simulated;

initialising the timing models based on the current clock cycle and using anticipated timing information within the transactions associated with the two or more concurrent data transfers (*Fischer, paragraph [0012]*).

46. Regarding claim 24 (and 41), Fischer and Thekkath teach:

The method as claimed in claim 22, wherein in the event that it is anticipated that two or more concurrent data transfers will occur the step d) further comprises the step of:

determining, using an arbiter model and based on the simulated bus signals, which of the master logic unit models and slave logic unit models will be allocated access to the bus during any particular clock cycle (*Fischer, paragraph [0012]*).

47. Regarding claim 25 (and 42), Fischer and Thekkath teach:

The method as claimed in claim 24, wherein in the event that it is anticipated that two or more concurrent data transfers will occur the step d) further comprises the step of:

signaling the master logic unit models and slave logic unit models with the outcome of the determination (*Fischer, paragraph [0012]*).

48. Regarding claim 26 (and 43), Fischer and Thekkath teach:

The method as claimed in claim 25, wherein in the event that it is anticipated that two or more concurrent data transfers will occur the step d) further comprises the step of:

on receipt of a signal indicating to a master logic unit model or slave logic unit model that access to the bus has been granted, generating the revised timing information indicative of the actual clock cycles over which the data transfer occurred (*Fischer, paragraph [0012]*).

49. Regarding claim 27 (and 44), Fischer and Thekkath teach:

The method as claimed in claim 22, wherein once the revised timing information has been generated for two or more concurrent data transfers, simulating bus signals generated by each of the corresponding master logic units and slave logic units on a clock cycle by clock cycle basis is suspended (*Fischer, paragraph [0012]*).

50. Regarding claim 28 (and 45), Fischer and Thekkath teach:

The method as claimed in claim 12, wherein in the event that it is anticipated that two or more concurrent data transfers will not occur, the step d) further comprises the step of:

causing the associated master logic unit model and slave logic unit model to remain inactive for the period of the data transfer (*Fischer, paragraph [0508]*).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NITHYA JANAKIRAMAN whose telephone number is (571)270-1003. The examiner can normally be reached on Monday-Thursday, 8:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571)272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nithya Janakiraman/
Examiner, Art Unit 2123

/NJ/

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